



**International University of Africa**

**College of Graduate studies**



**Assessment of kidneys' dose received from some surrounding  
organs radiographic examinations**

A thesis submitted in Partial Fulfillment of the Requirements for the Degree of  
Master in Medical Physics

**By:**

**TagwaTagEldin Ali Mohammed**

**Supervisor:**

**Dr .Nadia Omer AL-Atta**

**Associated professor**

2016

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قَالَ تَعَالَى:

﴿ وَقُلْ رَبِّ زِدْنِي عِلْمًا ﴾ ١١٤

صدق الله العظيم

الآية 114 من سورة طه

## *Dedication*

I dedicate my thesis to my family and friends. Especial feeling of gratitude to my loving parents, whose words of encouragement and support for tenacity ring in my ears, words couldn't be found to describe what they have done to me whole my life .

## *Acknowledgements*

I am extraordinarily grateful to the person who guided me throughout the long hard process of the preparation of this thesis; Dr. Nadia Omer Alatta , my supervisor for her countless hours of reflecting ,reading, encouraging , and most of all patience throughout the entire process . I would like to thank my father Tag Eldin Ali and my mother BatulAbulgasim for their imperative help, patience, support, care, hard work and for being there for me .I would like to acknowledge and thank myteachersand colleagues at International university of Africa for providing any assistance requested . Special thanks for the members of Medical Physic Department staff for their continued supports.

## **Abstract**

This study was performed in three hospitals at Khartoum state to assess the values of entrance surface air kerma (ESAK) and kidneys' dose for 60 adults patients whom their ages ranged between 20-80 years, underwent chest and abdominal radiographic examination. The essential aim of this study was to find the value of kidneys' dose and compare the value of ESAK with the reference level for diagnostic. The CALdose software was used to estimate these values by entering the exposure factors Kv and mAs, the output of the machine and information about the patient like age and gender. Variation was found in values of ESAK and kidneys' dose from one hospital to another at the same exam, these variations due to the difference in setting of exposure factors to each patient, also to the difference in the output of machine. By comparing these values with reference level for diagnostic, it was found that in some hospitals the values are higher than the reference level for diagnostic. Kidneys' dose was small and it has no considerable concern.

## المخلص

تمت هذه الدراسة في ثلاثة مستشفيات بولاية الخرطوم لتقييم كيرما السطحيه وجرعة الكلي لي 60 مريض اعمارهم ما بين 20 الي 80 سنه خضعو لي اشعة تشخيصية علي الصدر والبطن.الهدف الاساسي من الدراسه هو ايجاد قيمة جرعة الكلي وكيرما السطحية ومقارنتها مع الحدود المرجعية. تم استخدام برنامج ( CALdose ) لتقدير هذه القيم بادخال قيم عوامل التعرض kVpmAs. وجد ان هنالك اختلافات في قيم كيرما السطحيه وجرعة الكلي لي نفس الاختبار من مستشفى الي اخر هذه الاختلافات بسبب اختلاف قيم التعرض باختلاف المرضى وكذلك قيمة جهد الجهاز. بمقارنة هذه القيم مع القيم المرجعية وجد ان هنالك ارتفاع عن القيم المرجعية في بعض المستشفيات وان قيمة جرعة الكلي صغيرة ولا تمثل قلق جدير بالاعتبار.

**Abbreviation:**

|      |  |
|------|--|
| ESAK | Entrance Surface Air Kerma                       |
| INAK | Incident Air Kerma                               |
| ICPR | International commission on Radiation protection |
| NRPB | National Radiographic Protection Board           |
| CCs  | Conversion coefficients                          |
| FDD  | Field to Detector Distance                       |
| EM   | Electromagnetic                                  |
| AP   | Anterior Posterior                               |
| PA   | Posterior Anterior                               |
| LLAT | Left Lateral                                     |
| FDD  | Field to detector distance                       |
| DNA  | Deoxyribonucleic acid                            |
| ESD  | Entrance surface dose                            |
| ED   | Effective dose                                   |
| KAP  | kerma area product                               |
| LCD  | Digital liquid crystal display                   |

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